

Vadose Zone Fact Sheet Nevada Test Site

Background: The Nevada Test Site (NTS) is located approximately 104 km (65 mi) northwest of Las Vegas, Nevada in a sparsely populated region about the size of the State of Rhode Island. The site encompasses 3,510 km² (1,350 mi²) of desert and mountainous terrain, and is surrounded on three sides by the Nellis Air Force Range, which provides a substantial buffer between the site and public lands. The primary mission of the NTS has been to conduct field-testing of nuclear and conventional explosives in connection with the research and development of weapons.

Issues: A minimum of 49,400 hectares (20,000 acres) of soil is contaminated to a shallow depth with plutonium and other transuranics. Cleanup standards for plutonium contamination in soils do not exist. NTS has previously used a 200 pCi/gm cleanup level developed from a risk-based standard for industrial land use. The current approach is to use a cleanup level closer to 10⁻⁶ risk level. The regulators have not yet accepted this level.

Vadose zone infiltration: Vadose zone infiltration deeper than several meters under the basin floor is negligible.

Vadose zone characterization/remediation: Wastes were disposed in landfills, as well as by underground injection, sumps, and leach fields. Some residual materials remain in inactive storage tanks. In addition, approximately 1,200 hectares (3,000 acres) of surface and shallow subsurface soils are contaminated as the result of safety shots and plutonium-dispersion tests. When atmospheric and shallow cratering tests are included, this number increases to 10,900 hectares (27,000 acres).

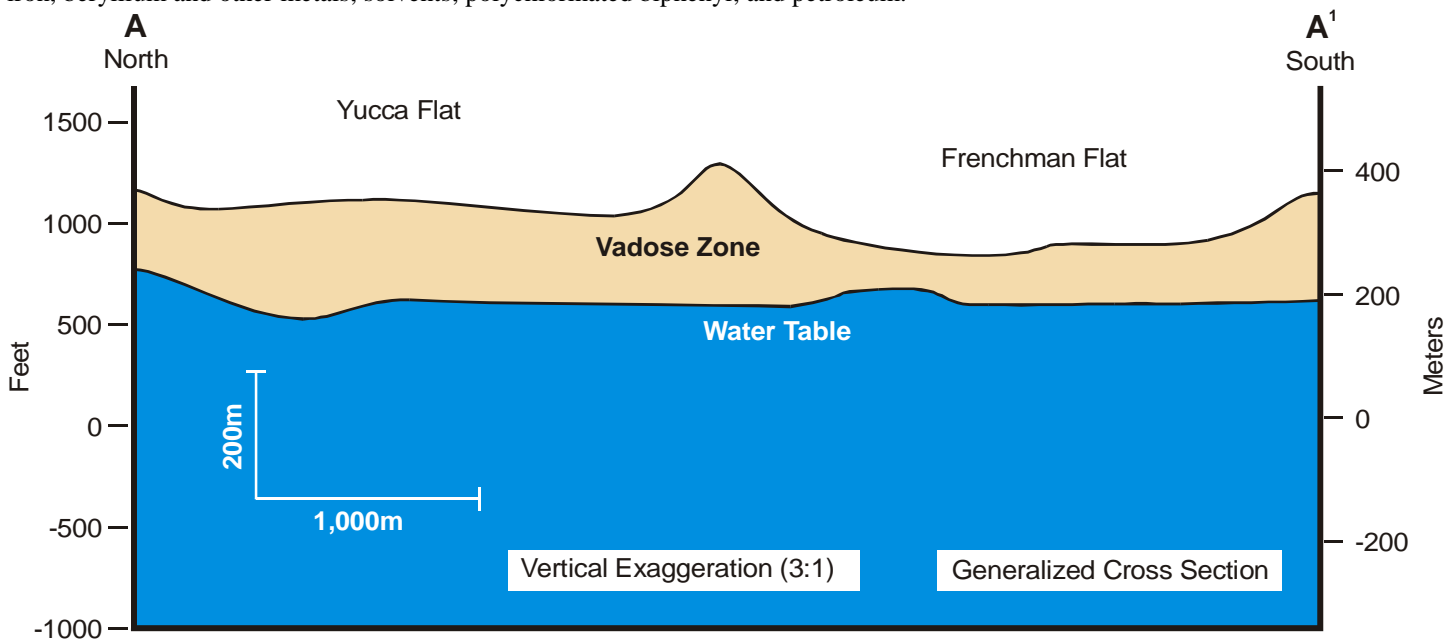
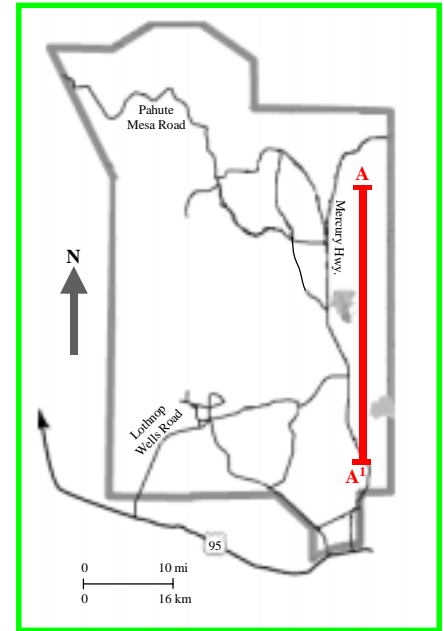
Precipitation: NTS is extremely arid with an average yearly rainfall in Frenchman Flat of 11.4 cm (4.5 in).

Surface waters: Surface water is restricted to intermittent flow in washes during storm events and in ephemeral playa lakes.

Geology: NTS is located in the southern Great Basin province, which is characterized by fault-block mountains and closed, fault-bounded, alluvium-filled basins. Bedrock, exposed in the higher elevations and buried under hundreds of feet of alluvium in the basins, is composed of volcanic and carbonate rocks.

Vadose zone thickness: The vadose zone ranges in thickness from 201 to 625 m (660 to 2050 ft).

Major contaminants of concern: Contaminants include radionuclides; buried mixed waste; organic compounds; chromium, lead, iron, beryllium and other metals; solvents; polychlorinated biphenyl; and petroleum.



Ground Water Fact Sheet Nevada Test Site

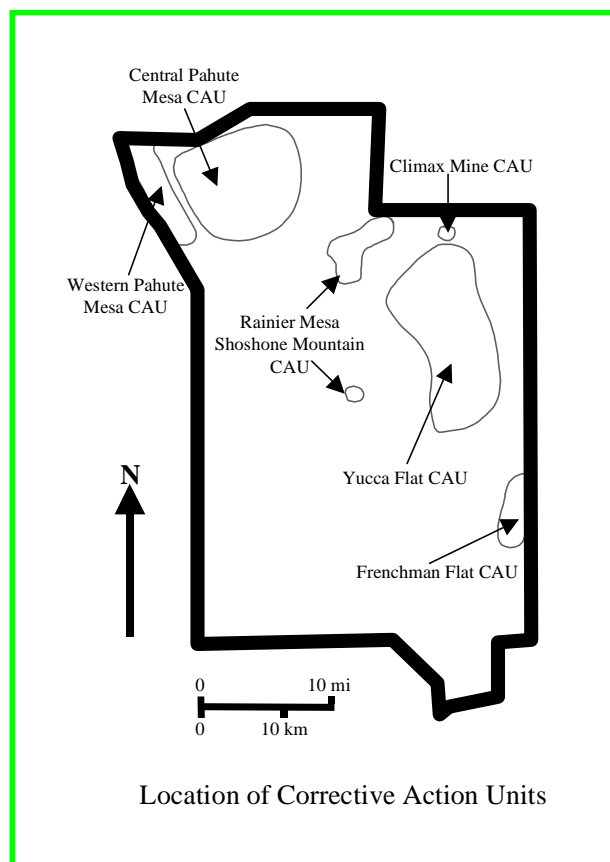
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Hydrogeology: NTS does not have a typical ground water contamination problem. There are greater than 300 million curies of radioactive contamination underground at the site, there are multiple aquifers, and the complex ground water system is very deep. The ground water flow direction across the site is generally south to southwest.

Issues: Ground water quality is the highest stakeholder priority at NTS. Results from regional ground water models indicate that tritium contamination could reach off-site receptors within 25 years.

Ground water characterization/remediation: There were 908 nuclear detonations conducted in shafts and tunnels at NTS, with approximately one third at or below the water table. NTS is conducting a two-phase phased approach to evaluate the extent of contamination in the ground water and to develop models to evaluate contaminant migration patterns in order to provide a long-term ground water monitoring network for protection of the public and workers. Phase I, completed in 1997, developed a regional ground water model. Phase II will develop individual ground water models for six corrective action units (CAUs). The CAUs are shown on the map provided.

Ground water use: The ground water is potable and is used exclusively by the Department of Energy.



Corrective Action Units	Contaminants	Depth	Remedial Approach
Frenchman Flat	Numerous radioactive isotopes	>244 m (800 ft)	Close in place, monitor
Western Pahute Mesa	Numerous radioactive isotopes	>610 m (2,000 ft)	Close in place, monitor
Yucca Flat	Numerous radioactive isotopes	>488 m (1,600 ft)	Close in place, monitor
Central Pahute Mesa	Numerous radioactive isotopes	>610 m (2,000 ft)	Close in place, monitor
Climax Mine	Numerous radioactive isotopes	>488 m (1,600 ft)	Close in place, monitor
Rainier Mesa/Shoshone Mesa	Numerous radioactive isotopes	>488 m (1,600 ft)	Close in place, monitor